



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/508,818	09/22/2004	Masato Hiramatsu	15007/21:1	6211
3528	7590	12/28/2005	EXAMINER PHAM, LONG	
STOEL RIVES LLP 900 SW FIFTH AVENUE SUITE 2600 PORTLAND, OR 97204-1268			ART UNIT 2814	PAPER NUMBER

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/508,818

Applicant(s)

HIRAMATSU ET AL.

Examiner

Long Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 15-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 15-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>09/22/04</u> .  | 6) <input type="checkbox"/> Other: ____.                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 1-9 and 15-25 in the reply filed on 11/07/05 is acknowledged.

### ***Drawings***

Figure 15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9, 18, 19, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope and meaning of claims 9, 18, 19, and 20 are not understood because it is unclear how the first angle is defined since it is unclear how the imaginary line connecting only one point defines a line and it is unclear how the second angle is defined since the first and second junction widths are parallel, how the angle can be defined by the first and widths. Hence, claims are indefinite.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nieder et al. (US patent 5,385,865)

Nieder et al. teach a semiconductor device, comprising (see fig. 14 and associated text):

A substrate;

A conductive type semiconductor layer 44 provided on the substrate and having sectorial or trapezoidal shape;

A transistor provided on the conductive type semiconductor layer such that electric current inherently flows along a grain boundary.

Nieder et al. teach an opening angle but the angle appears to be less than 20 degrees.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the opening angle through routine experimentation and optimization to obtain optimal or desired device performance because in the absence of unexpected results it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Nieder et al. (US patent 5,385,865).

With respect to claim 2, Nieder et al. teach a transistor, comprising (see fig. 14 and associated text):

a conductive type semiconductor layer 44;

a source region and a drain region that are separately provided in the semiconductor layer such that electric current flows along a grain boundary;

a gate electrode provided above the semiconductor layer with an insulating film inherently interposed therebetween; and

wherein a channel region is located between the source region and the drain region and a first junction face extends between the source region and the channel region and has a first junction face width, and a second junction face extends between the channel region and the drain region and has a second junction face width, and wherein the first junction face width differs from the second junction face width.

With respect to claim 3, Nieder et al. further teach the semiconductor layer has a trapezoidal or sector plane shape.

***Claim Rejections - 35 USC § 103***

Claims 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19, and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nieder et al. (US patent 5,385,865) in combination with Taketomi et al. (US publication 2003/0022471).

With respect to claim 4, Nieder et al. teach an opening angle but the angle appears to be less than 20 degrees.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the opening angle through routine experimentation and optimization to obtain optimal or desired device performance because in the absence of unexpected results it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 5, 15, and 16, Nieder et al. fail to teach that semiconductor or active or channel layer has grain boundary extending parallel with source-drain direction.

Taketomi et al. teach that a semiconductor or active layer or channel that has grain boundary extending parallel with source-drain direction exhibits high mobility. See [0075].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Taketomi et al. into the device of Nieder et al. to achieve the above benefit.

With respect to claim 6, since Nieder et al. in combination Taketomi et al. teach the claimed device, each of grain boundary would inherently extend in-plane with the semiconductor layer in correspondence with an opening angle of the trapezoidal or sector plane shape. See above.

With respect to claims 7 and 17, Nieder et al. in combination Taketomi et al. further teach that the grain boundaries are adjacent to each other. See above.

With respect to claim 8, Nieder et al. in combination Taketomi et al. further teach that the grain boundaries are in parallel with an in-plane direction of the semiconductor layer. See above.

With respect to claims 9, 18, 19, and 20, to extent understood, Nieder et al. in combination Taketomi et al. appear to fail to teach the relative angle.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the relative angle through routine experimentation and optimization to obtain optimal or desired device performance because in the absence of any unexpected results it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 21, 22, and 23, since Nieder et al. in combination Taketomi et al. teach a transistor having high mobility, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to include it in a liquid crystal display to obtain a display with high mobility.

With respect to claims 24 and 25, since Nieder et al. in combination Taketomi et al. teach a transistor having high mobility, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to use the taught structure form n type or p type transistor to obtain transistor with high mobility.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Long Pham

Primary Examiner

Art Unit 2814

LP

LONG PHAM  
PRIMARY EXAMINER